

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* YOSHIO OZAWA, YASUMASA SUIZU, and  
YOSHITAKA TSUNASHIMA

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Appeal 2006-2595  
Application 09/559,757  
Technology Center 1700

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Decided: December 22, 2006

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Before PAK, KRATZ, and TIMM, *Administrative Patent Judges*.

PAK, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the Examiner's final rejection of claims 8 through 15, 20, and 21. Claims 16 through 19, the other claims in the above-identified application, stand withdrawn from consideration by the Examiner as being directed to a non-elected invention. We have jurisdiction pursuant to 35 U.S.C. § 134.

## I. APPEALED SUBJECT MATTER

The subject matter on appeal is directed to subjecting a semiconductor substrate having particular conductive and insulating films to a specific thermal oxidation condition to obtain a semiconductor device “capable of preventing dielectric failure from occurring at the edge of a conductive film of a structure...(Specification 7-8) . Further details of the appealed subject matter are recited in representative claim 8 which is reproduced below:

8. A method of manufacturing a semiconductor device comprising the steps of:

forming an insulating film containing silicon and nitrogen on a semiconductor substrate;

forming a film which must be processed and which contains silicon on the insulating film;

processing the film which must be processed to cause a portion of the insulating film to be exposed to the outside; and

lowering a surface of the semiconductor substrate under a part of the insulating film relative to a surface of the semiconductor substrate under the film which is processed to cause the portion of the insulating film to be exposed to the outside by applying a thermal oxidation process to a semiconductor structure obtained owing to the above steps, the thermal oxidation process using an oxidizing gas containing one of ozone and oxygen radicals, the oxygen radicals being generated by remote plasma oxidizing method or by reacting a first gas containing oxygen and a second gas containing hydrogen, and a concentration of nitrogen of the part of the insulating film under an edge portion of the film being decreased by the thermal oxidation process.

## II. PRIOR ART

As evidence of unpatentability of the claimed subject matter, the Examiner relies upon the following references:

|           |                 |               |
|-----------|-----------------|---------------|
| Hisamune  | US 6,414,352 B2 | Jul. 2, 2002  |
| Aminzadeh | US 6,707,120 B1 | Mar. 16, 2004 |

Wolf, *Silicon Processing for VLSA Era*, Vol. 1, pp.161-238 (1986).

The Appellants' admission at pages 7, 18, 20, and 21 of the Specification (hereinafter referred to as "admitted prior art").

## III. REJECTION

Claims 8 through 15, 20, and 21 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combined teachings of the admitted prior art, Hsamune, Aminzadeh, and Wolf.

## IV. FACTUAL FINDINGS AND CONCLUSIONS

We have carefully considered the claims, Specification and prior art references, including the arguments advanced by both the Appellants and the Examiner in support of their respective positions. This review has led us to conclude that the Examiner's § 103 rejection is not well founded. Accordingly, we will not sustain the Examiner's decision rejecting the claims on appeal under § 103 for the reasons well articulated by the Appellants in their Brief and Reply Brief. We add the following for emphasis only.

As stated by our reviewing court in *In re Kotzab*, 217 F.3d 1365, 1369-70, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000):

Most[,] if not all[,] inventions arise from a combination of old elements. *See In re Rouffett*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998). Thus, every element of a claimed invention may often be found in the prior art. *See id.* However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. *See id.* Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. *See In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998); *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984).  
[underscoring added.]

It is noted that evidence of a suggestion, motivation or teaching may come explicitly or implicitly from the prior art references themselves, the knowledge of one of ordinary skill in the art, or the nature of the problem to be solved. *See Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996); *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). Producing such evidence by the Examiner is an essential part of complying with the burden of presenting a prima facie case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Fine*, 837 F.2d 1071, 1073-74, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988).

Here, the Examiner asserts at page 3 of the Answer that the claimed method was admitted to be known at the time of the invention, except for the following claimed step:

lowering a surface of the semiconductor substrate under a part of the insulating film relative to a surface of the semiconductor substrate under the film which is processed to cause the portion

of the insulating film to be exposed to the outside by applying a thermal oxidation process to a semiconductor structure obtained owing to the above steps, the thermal oxidation process using an oxidizing gas containing one of ozone and oxygen radicals, the oxygen radicals being generated by remote plasma oxidizing method or by reacting a first gas containing oxygen and a second gas containing hydrogen, and a concentration of nitrogen of the part of the insulating film under an edge portion of the film being decreased by the thermal oxidation process.

To remedy these deficiencies, the Examiner relies on the disclosures of Wolf, Hisamune, and Aminzadeh. See Answer 3-7. However, as correctly argued by the Appellants (Br. 12-19 and Reply Br. 3-8), the Examiner does not point to any suggestion or motivation that would have led one of ordinary skill in the art to apply appropriate thermal oxidation conditions in the presence of ozone or specific oxygen radical to lower a surface under a part of an insulation film containing silicon and nitrogen and decrease a concentration of nitrogen of the part of the insulation film. Rather, Hisamune, for example, teaches against using a combination of such insulation film with thermal oxidation conditions for purposes of oxidizing and lowering a surface below. That is, Hisamune teaches that the use of a film containing silicon and nitrogen provides an oxidation proof property, i.e., a barrier to oxygen radicals (col. 4, ll. 55-68).

Under these circumstances, we cannot agree with the Examiner that the prior art references as a whole would have led one of ordinary skill in the art to employ a combination of the claimed specific thermal oxidation conditions and insulation film for purposes of lowering a surface under a part of the insulation film. Accordingly, we reverse the Examiner's decision rejecting the claims on appeal under 35 U.S.C. § 103.

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## V. CONCLUSION

The decision of the Examiner is reversed.

REVERSED

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